INSTRUCTION MANUAL

PC202
Potentiometric Transducer Conditioner

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PC202
Potentiometric Transducer Conditioner

MODEL PC202

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MODEL PC202

1.1 DESCRIPTION

The PC202 Plug-in Module provides signal-conditioning for potentiometric transducers such as linear or angular position transducers. It provides full-range zero adjustment and five switch-selectable gain steps to provide a buffered output voltage which is a function of the full-scale transducer signal voltage or a part of it. Either DC or AC operating modes can be selected by a front-panel selector switch.

In the DC mode, the signal amplifier is DC-coupled for all gain positions, with a frequency response of DC to 200 Hz.

In the AC mode, the signal amplifier is AC-coupled in all settings of the gain switch except the IX position, in which it is DC-coupled. The AC mode allows measurement of amplified dynamic displacements about a zero-based static level.

A typical application for the AC mode of operation is the measurement of low-frequency vibrational amplitude about a static position measured in the DC mode.

"AC" - In the 2.5, 5, 10 and 25 X settings, the amplifier is AC-coupled to provide an output proportional to the AC portion of the transducer's shaft position. In this mode, the frequency response is 0.2 Hz to 200 Hz. In the "IX" setting of the Gain Switch, the amplifier is direct-coupled to provide an indication of the transducer's shaft position.

"DC" - In this mode, the amplifier is direct-coupled for all gain positions. Frequency response is DC to 200 Hz.

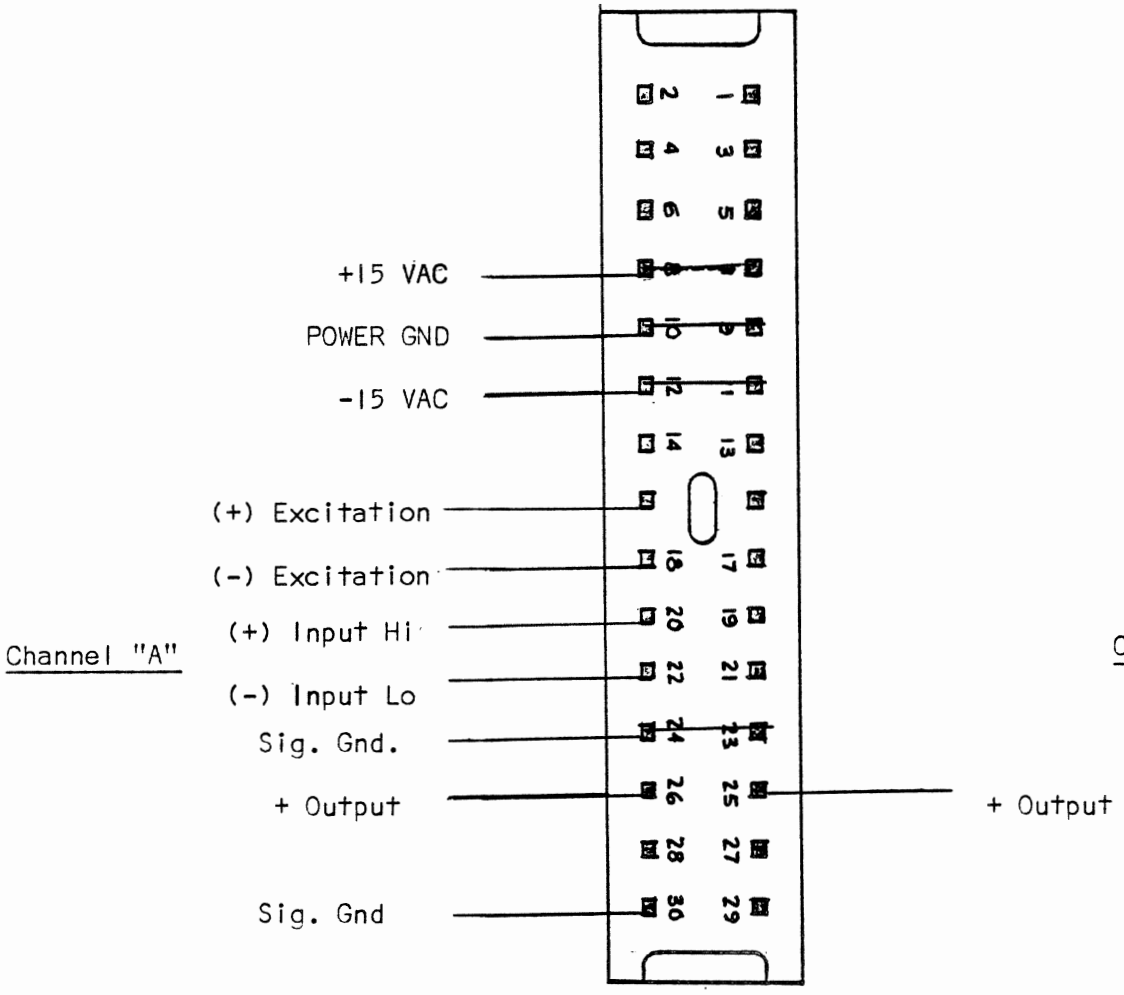
1.2 ELECTRICAL SPECIFICATIONS

Input:	±12V max; will not be damaged by momentary application of 115V
Input Impedance:	22 Megohm
Input Current:	50 nanoamps (typical)
Transducer Excitation:	12.9 volts balanced to circuit ground, 2.85K ohm source impedance
Input Gain:	1 to 100, determined by fixed resistor on bifurcated terminals
Gain Vernier:	10 to 110% adjustment by front panel trim potentiometer
Output Gain Switch:	DC or AC mode 2.5 X, 5 X, 10 X and 25 X. DC only on 1 X range
Output:	±10V at 2 ma; ± 11V max
Output Impedance:	Less than 10 ohms
Frequency Response:	DC: 0 to 200 Hz AC: 0.2 to 200 Hz
Temperature:	Operating range: 0^{o} to 150^{o}F Zero shift: ±20uV/^{o}F referred to input Span shift: .005%/^{o}F
Power:	±15Vdc, 10 ma (from MC170 power supply)

1.3 MECHANICAL SPECIFICATIONS

Length:	7.5"
Width:	0.45"
Height:	2.76"
Weight:	4 oz. Avdp.

1.4 Input and Output Connections: (Accessible through Printed Circuit Board Connector at Rear of MC170 Module Case.)



Printed Circuit Board Connector

As Viewed from Rear of MC170 Module Case

(WIRE-WRAP TERMINAL VERSION)

1.5 ADJUSTMENTS, CONTROLS, AND TEST POINTS

Figure 1 shows the location of available controls and test points on the front panel and circuit board for the PC202.

1.5.1 Front Panel Controls:

A. ZERO CONTROL (Input): The zero control is a screwdriver actuated 20 turn (nominal) adjustment potentiometer. The excitation for the zero control is identical to the voltage supplied for external potentiometric devices and therefore has full-range zero capability. Full CW position provides zero nulling voltage for full-scale negative input.

B. SPAN CONTROL: Span control is used to set full-scale output in conjunction with the Gain selection switch. The control is a screwdriver actuated 20 turn (nominal) adjustment potentiometer. Span range is 10% to 110% of the range selected by the Gain Switch.

C. GAIN SWITCH: The Gain Switch is a 6-position, screwdriver actuated rotary switch. Switch position is indicated by a black arrow on the slotted adjustment screw head. (NOTE: There are no internal stops in the rotary switch to indicate beginning or end of rotation; therefore, position of the switch is determined by the position of the arrow relative to the indexing lines on the front panel.) Center position top is not a functional position.

   From the schematic and Figure 1, the resistor dotted in and designated RX may be installed when a gain greater than 25 is desired. Bifurcated terminals E4 and E5 are provided for this.

D. AC-DC MODE SELECT: The AC-DC selection switch is a two-position toggle switch to select AC or DC operation.

E. OUTPUT ZERO (R30): Output zero is a single turn flat package potentiometer used for factory adjustment and is available from the side of the circuit board.

F. COMMON MODE BAL (R13) is a factory set single-turn flat package potentiometer like the output zero potentiometer. It is used to adjust for common mode of the input differential amplifier.

G. TEST POINTS: Test points for input signal and output signal as referenced to ground are available on the front panel; single pin plug-in jacks may be used at these test points.

SECTION 2

OPERATION

2.1 INSTALLATION AND CALIBRATION

The PC202 may be plugged into any available position in the MC170 Module Case regardless of whether power is on and other channels are in operation. There will be no effect on adjacent channels.

2.2 INPUT/OUTPUT CONNECTIONS

2.2.1 Input and output to the PC202 are through the rear panel receptacle marked "Transducer Input" and "Output" on the back panel of the MC170 case, with pin assignments as shown on schematic.

2.3 CALIBRATION

Calibration has been accomplished at the factory. However, in some cases functional verification of the PC202 may be required. The PC202 functional requirements are as follows:

2.3.1 Output Zero Offset, Adj. (R30) (See Figure 1)

Conditions:

A. Mode switch - AC position

B. Place jumper (clip leads) from junction of R17, R18, C_3, Point (A) on Figure 1, and ground (TP3).

C. Gain Select - X2.5 Position

Adjustment:

Adjust R30 "Output Zero" potentiometer to obtain zero output at TP2.

2.3.2 Common Mode Balance Adj. (R13)

Jumper pin 20, TP1, to junction of R4, R5, Point (B). Apply approximately 5 VAC at approximately 50 Hz, sine, at TP1. Observe wave form at U1-Pin 10 and adjust R13 (common mode pot) to obtain null indication. (Remove jumper).

2.3.3 Zero Adjust No external connection at pins 16 and 18

Jumper TP1 to ground.
DC voltage at U1-Pin 10, with "Zero" pot (R2)

@ fully CW = ±5.8 to ±7.09 VDC
@ fully CCW = -5.8 to -7.09 VDC

2.3.3 Zero Adjust (Continued)

Set "Zero" pot (R2) to obtain 0 ±0.005 VDC at U1-Pin 10. Leave R2 at this position for remaining tests.

2.3.4 System Gain Tests

Mode Switch S1 — DC Mode
Span pot (R15) — fully CW position

A. Connect adjustable DC signal at Pin 20. Monitor TP2 output while adjusting E_{in} @ Pin 20:

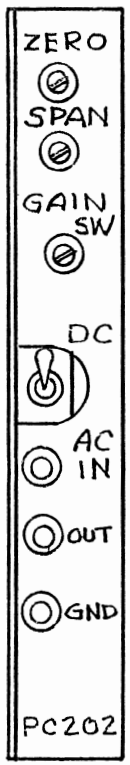
S2 Gain Switch	(Pin 20) E_{in}	Set Output @ TP2
X1	0 ±0.015 VDC	0.00 VDC
X1	+8.82 to ±9.36 VDC	+10.00 VDC
X2.5	+3.52 to ±3.76 VDC	+10.00 VDC
X5	+1.75 to ±1.89 VDC	+10.00 VDC
X10	+0.867 to ±0.951 VDC	+10.00 VDC
X25	+0.338 to ±0.390 VDC	+10.00 VDC

B. Reverse polarity of input signal; output @ TP2 = -10.00 ±0.10 VDC.

C. Adjust span pot (R15) fully CCW, TP2 output = -0.81 to -0.99 VDC. Restore span pot (R15) to CW position.

2.3.5 System Calibration

For system calibration connect transducer and apply pressure or position for "0" and then full scale. Now set the controls described above for desired output signal.



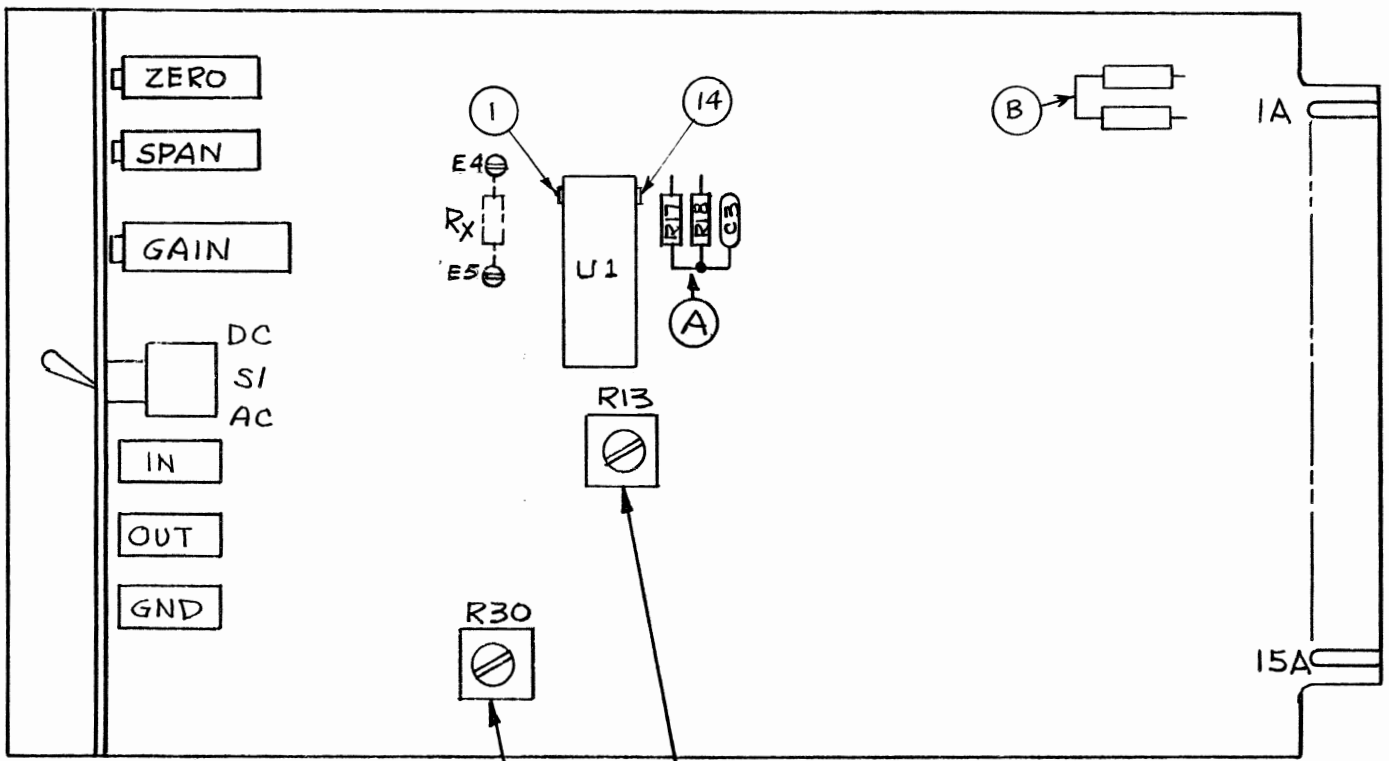


FIGURE 1

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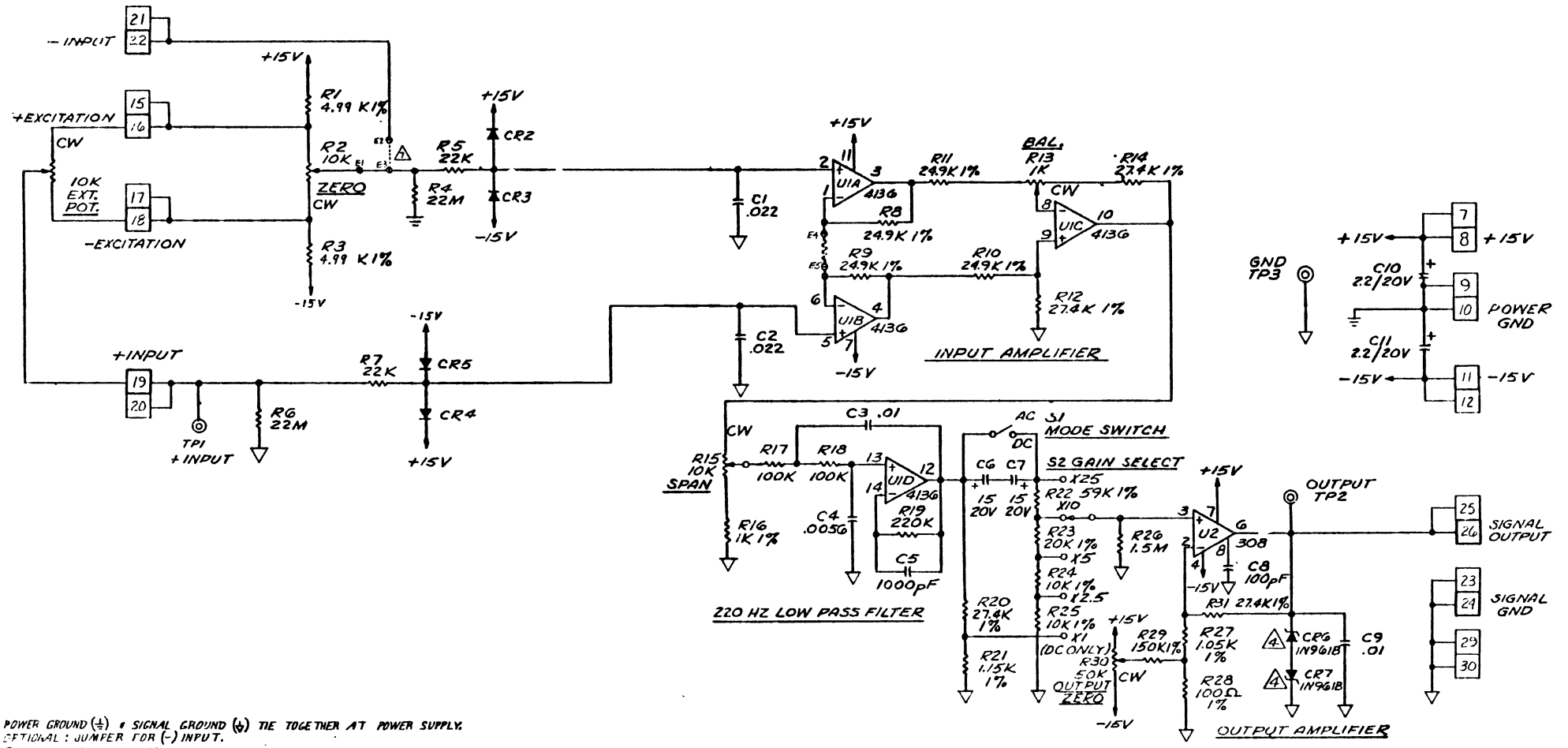

8. POWER GROUND (⏚) & SIGNAL GROUND (⏚) TIE TOGETHER AT POWER SUPPLY.
7. OPTIONAL: JUMPER FOR (-) INPUT.
6. Θ INDICATES BIFURCATED TERMINALS, 5 PLACES.
5. DIODES ARE IN914
4. CR6 & CR7 ARE SCREENED: (≥9.5VDC @ 0.5mA)
3. CAPACITOR VALUES ARE IN MICROFARADS.
2. RESISTOR VALUES ARE IN OHMS ±5% 1/4 WATT.
1. CIRCUIT BOARD ASSEMBLY, PN 9064-1.

NOTES: UNLESS OTHERWISE SPECIFIED.

WARRANTY

VALIDYNE ENGINEERING CORPORATION warrants equipment of its own manufacture to be free from defects in material and workmanship under normal conditions of use and service.

VALIDYNE will rework or replace any item found to be defective on as return to VALIDYNE within the time specified below:

1. Pressure Transducers and Pressure Transmitters (including transducers supplied as part of Digital Manometer Systems) within three (3) years of its original purchase.

2. Electronics products (Transducer Indicators, Carrier Demodulators, plug-in SignalCondioners, Module Cases, etc.) within one (1) year of its original purchase.

3. OEM Transducers within one (1) year of its original purchase.

Buyer is requested to secure authorization of VALIDYNE, and to describe defect prior to return of equipment under warranty. Shipment to VALIDYNE shall be at Buyer's expense, with return at VALIDYNE's expense. NON-VERIFIED problems or malfunctions, whether warranty or not, are subject to a $100.00 evaluation charge.

The warranty carries no liability, either expressed or implied, beyond our obligation to rework or replace, at VALIDYNE's option, the unit which carries the warranty to the original purchaser. Prices, specifications, and designs are subject to change without notice. This warranty is void if the product is subjected to misuse, accident, neglect, or improper application or operation.

Out of Warranty Rework

Units returned to VALIDYNE for rework which are out of warranty will be subject to the following conditions:

1. A description of the problem or malfunction shall accompany the unit returned for rework, or be communicated to VALIDYNE prior to shipment. Otherwise there will be a minimum evaluation and/or calibration charge of $100.00.

2. Unit will be reworked automatically if the charge is less than 65% of current list price, unless other specific instructions are received. Above 65% VALIDYNE will request authorization by Buyer.

3. If a quotation is required before proceeding with rework, unit should be accompanied by a document so stating, or communicated to VALIDYNE prior to shipment. A $100.00 evaluation charge will be invoiced for this service.

4. Shipping charges in both directions are the responsibility of the Buyer for all out of warranty returns.

Warranty on Rework

Warranty coverage on rework is 90 days on work done, or to the end of the original warranty period, whichever is longest.

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